# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

AUGUST 26, 1933

**Playmates**

See Page 133

A SCIENCE SERVICE PUBLICATION

# SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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*Edited by* WATSON DAVIS

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# DO YOU KNOW?

The oldest known maps of cities are from Mesopotamia.

Whether ivy poisoning ever causes death is a question which doctors have not settled.

Sitka spruce has such qualities of resonance that it is much used for piano sound boards and organ pipes.

One of the many puzzling facts about cancer is that this widespread disease is apparently unknown in the district of Lahul, India.

In the epidemic of 1770 and 1771, three million people died of smallpox in the East Indies.

The spectacled bear of the Andes Mountains has light rings around its eyes, very much like glasses.

A life insurance company in the west found that, out of 6,200 children, only 24 per cent. had been immunized against diphtheria.

A tunnel under the Straits of Gibraltar, to link Europe with Africa, is again being promoted.

It is estimated that from two to four per cent. of the people in this country are afflicted with heart disease.

Pairs of linen gloves were among the clothing of the Egyptian pharaoh Tutankhamen who lived in the fourteenth century B. C.

When the giant water lily, the *Victoria regia*, blooms it has been observed to give off heat 14 degrees centigrade above the surrounding air.

A government scientist found that a layer of chromium no thicker than four ten-thousandths of an inch will lengthen the life of the rifling in guns.

Rosin, tar, and turpentine came to be called "naval stores" in the days when sailing vessels used pine tar to waterproof ropes and sails and other parts of ships.

# WITH THE SCIENCES THIS WEEK

AERONAUTICS

Who wants to fly by muscle power? p. 137.

ARCHAEOLOGY

Did Cortes see the Aztec ruins now being restored in Mexico? p. 138. *Ancient Civilization of Mexico and Central America—Herbert J. Spinden—American Museum of Natural History*, 1928, $1.

ASTRONOMY

How bright is Sirius' companion? p. 136.

What has happened to the Saturnian spot? p. 136.

When did Nova Ophiuchi Number Three brighten? p. 132.

BOTANY

Where are new species a century old being found? p. 135.

Why does nature provide "impermeable" seeds? p. 131.

BOTANY-ENTOMOLOGY

How may a plant be used to fight locusts? p. 132.

CHEMISTRY

How can oil be found without drilling? p. 137.

How much bromine does a cubic mile of seawater contain? p. 138.

ENTOMOLOGY

How many legs can a mantis shed? p. 137.

How may grasshoppers be fought now and during the winter? p. 141. *Manual of Injurious Insects—Glenn W. Herrick—Holt*, 1925, $4.50.

GEOLOGY

How much does Chicago rise each year? p. 139.

How were mineralogical names standardized? p. 137.

METEOROLOGY

Why are China's floods severe? p. 141. *China, Land of Famine—Walter H. Mallory—Amer. Geographical Soc.*, 1926, $4.

ORNITHOLOGY

Where does the white pelican nest? p. 136.

PALEONTOLOGY

Are sirenian fossils abundant? p. 136.

PHYSICS

How much heat does gold generate? p. 131.

What is the energy of the neutron? p. 131. *Atoms, Molecules and Quanta—A. E. Ruark and H. C. Urey—McGraw-Hill*, 1930, $7.

Where does the energy of interstellar space come from? p. 135.

PSYCHOLOGY

Can a chimpanzee be taught good manners? p. 133. *The Ape and the Child—W. N. Kellogg and T. A. Kellogg—Whittlesey House*, 1933, $3.

RADIO

What are the advantages of metal radio tubes? p. 137.

TECHNOLOGY

Do aluminum paints make good primers? p. 136.

*These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.*

PHYSICS

# Using American Photos, Britons Find Double Weight Neutron

## Calculations Based on Thousands of Collision Pictures Show Existence of Heavier Brother to Building Block of Atoms

THE recently discovered building block of atoms, the neutron, may have a heavier brother. Evidence for the existence of a neutron of mass two instead of usual mass one is presented by Harold Walke in a communication to *Nature*. Mr. Walke is physicist at the Washington Singer Laboratories, Exeter, England.

This evidence is based on photographs taken in the United States by Prof. William D. Harkins, Dr. D. M. Gans and H. W. Newson at the University of Chicago and by Prof. F. N. D. Kurie at Yale University.

### No Charge on Neutrons

These experimenters took thousands of instantaneous pictures of actual collision between neutrons and nitrogen atoms. Calculations based on these pictures of these atomic disasters and disintegrations showed that some of the bombarding neutrons were twice as heavy as the original neutrons found by Dr. James C. Chadwick at Cambridge University, England, over a year ago.

The ordinary neutron of mass one is unique as a fundamental atomic building block because it does not have an electrical charge. It only has weight or mass. This mass is the same as the mass of the heart of a hydrogen nucleus or atomic heart called a proton. The neutron has proved to be immensely valuable to theoretical physicists in explaining how the hearts of heavier atoms are built up. Neutrons are produced by bombarding beryllium, one of the lightest elements with alpha particles which are the hearts of helium atoms.

### Secondary Units

These conjectures of the ways in which heavy atom hearts are built up led Lord Rutherford of Nelson, Cambridge University physicist, to postulate that uncharged units of mass two as well as neutrons of mass one might be secondary units in the structure of nuclei.

Dr. Chadwick had found that the energy of a neutron was 8,000,000 electron volts whereas the American photographs showed energies as high as 16,000,000 and 17,000,000 electron volts. Mr. Walke has concluded that these high energies are due to a rarer neutron of mass two.

*Science News Letter, August 26, 1933*

PHYSICS

## Gold Soaks Up Water And Gets Hot

GOLD when exposed to water gradually produces heat, Prof. Frederick Barry and Elliott P. Barrett of Columbia University state in a communication to the *Journal* of the American Chemical Society.

A piece of massive gold exposed to water vapor at room temperatures gradually gave off heat for seven hours. They state that heat would be generated indefinitely but in gradually decreasing amounts. By weighing they have found that water is adsorbed but do not believe that an explanation can be given on this basis alone.

The amount of heat liberated by this process is very small for it would take about 250,000,000 square inches of gold to generate enough heat energy to run a one horse power machine for one hour.

*Science News Letter, August 26, 1933*

BOTANY

## Seeds Undrowned After 23 Years Under Water

SEEDS of the common weed known as velvet-leaf or butter-print are proof against drowning.

Such at least would seem to be the conclusion justified by a long-time experiment performed by Prof. W. E. Davis of Kansas State Agricultural College at Manhattan, Kans. In 1910 he put sample lots of 100 seeds each of this plant in small bottles of water, and corked them tightly. At the time he did not intend the experiment to be one of such long duration, but merely meant to show to his students how seeds differed in the permeability of their coats.

The seeds showed this nicely: about a third of them soaked in water and swelled up within a few days after they had been corked. The bottles were accordingly uncorked and the swelled-up seeds removed.

However, at the end of 20 years, two bottles remained containing seeds that had never swelled, indicating that they had never permitted any water to pass through their seed coats. One of the bottles was then opened, and its two remaining seeds were taken out. Their tough coats were chipped with a knife and they were put in a germinator. They promptly sprouted, the two decades of total immersion they had undergone apparently making no difference in their behavior.

Prof. Davis still has one bottle containing four seeds, which are now in their twenty-third year of soaking. They have not changed their appearance in any way, and presumably would germinate now as readily as their two companions did three years ago.

A high degree of impermeability seems to be a distinct advantage to seeds of many plant species, enabling them to lie in the ground for several years, as a sort of reserve, while their companion seeds sprout immediately.

*Science News Letter, August 26, 1933*

**CHAMPION SUBMARINE SEEDS**

***Twenty years under water in a tightly corked bottle had no terrors for these seeds, which sprouted promptly when they were given the chance.***

ASTRONOMY

# Famous Variable Star Now Brighter Than Ever Before

## Large Observatories Study 10,000-Year-Old Burst Into Brilliance First Observed by Amateur Astronomer

A FAMOUS star in the constellation of Ophiuchus, now visible in the southwestern evening sky, is now brighter than ever before recorded, according to Dr. Harlow Shapley, director of the Harvard College Observatory. Dr. Shapley received word a few days ago from Leslie C. Peltier, of Delphos, Ohio, an assiduous amateur observer of variable stars, that this object had attained the magnitude of 6.4, nearly bright enough to be seen with the naked eye in a dark sky.

The star is known as Nova Ophiuchi No. 3, and is classed with the stars that, from a previous career of inconspicuousness, suddenly flash out with a brilliance rivalling that of the brightest stars known. Many years ago it was first observed, but, contrary to the habits of most "new stars," as they are commonly called, which after a few years return to their original brightness and stay there, this one has continued to attract the attention of astronomers.

According to Dr. Shapley, the greatest brilliance hitherto recorded for Nova Ophiuchi was in 1898, when it was of magnitude 7.7. In the last twenty-five years, it has varied between 10.8 and 11.8. Under best conditions, the naked eye can perceive stars to about the sixth magnitude, while a small field glass will reveal them a magnitude or two fainter. A moderate sized telescope is required to show them as faint as the tenth magnitude.

On the night of August 16 Dr. Dean B. McLaughlin, of the University of Michigan Observatory, analyzed its light. He has reported that the spectrum shows broad, diffuse bands due to hydrogen and ionized iron in the star and that just to one side of these bands are the familiar dark lines, displaced to the violet end of the spectrum.

The behavior of the spectrum, and the amount of the shifts of the bands and the lines seems to indicate that the star is following the usual procedure for such an outburst, which is really some sort of explosion. The star expels an ever widening shell of glowing gas, which causes the bands in the spectrum. The measurements made by Dr. McLaughlin indicate that this shell is leaving the star at a speed of 1000 kilometers, about 620 miles, per second.

The displacement of the dark lines, due not to the light from the luminous gaseous shell itself but to the absorption by this shell of the light from the more brilliant star, indicate that part of the shell is approaching us with a speed of 30 kilometers (19 miles) per second, and another part with a speed of 160 kilometers (99 miles) per second. Perhaps the difference between this and the speed of the expanding shell is due to the fact that the star and the shell are moving away from us at a speed equal to the difference.

Mr. Peltier's discovery was also confirmed by photographs taken by the Harvard College Observatory Oak Ridge Station during its routine photographic patrol of the sky. The star was invisible on photographs taken on the night of Aug. 9-10 that showed stars as bright as magnitude 8, and it was photographed with a magnitude of 6 on the night of Aug. 14-15. On the night of Aug. 16-17 it had dimmed to a photographic magnitude of 6.5.

Although the increase of radiance of this star is only now being seen on earth, the brightening of the star occurred some 10,000 years ago. The star is so far distant from the earth that it takes that time for the light to reach the earth.

The cause of a nova is not fully understood, but it is believed to be due to a sudden release of energy in the atoms of the star. This might be started by the impact of a tiny body far smaller than the star itself, which would act as the trigger to start the explosion. They were at one time thought due to the collision of two stars, but novae occur much too often to be accounted for in this manner.

*Science News Letter, August 26, 1933*

ASTRONOMY

## Discoverer Tells How He Found Stellar Flareup

By LESLIE C. PELTIER

THE INCREASE in brightness of the "new star," Nova Ophiuchi Number Three was first noted at Delphos, Ohio, on Tuesday night, Aug. 15, at 10 p. m., E.S.T. At this time its magnitude was estimated at 6.4 or just faintly visible to the naked eye.

After carefully checking everything so that there was no chance of misidentification, the news was immediately wired to both Yerkes and Harvard College Observatories.

I have had this star under observation since early in 1921 and I have always found it about the eleventh magnitude or just visible in a three inch telescope.

A nightly search for new stars as well as frequent telescopic observations of former novae has for many years been a regular part of my work.

This is the first naked eye nova to be seen in this latitude since August, 1920.

*Science News Letter, August 26, 1933*

BOTANY-ENTOMOLOGY

## Plant and Ants Cooperate To Destroy Grasshoppers

WHILE looking for ways of utilizing natural plant and other enemies to combat the locust plague, Guillermo Gandara, formerly of the Mexican Ministry of Agriculture, discovered a weed which is really an automatic trap for these destructive insects. In the Republic of San Salvador, Sr. Gandara found in a gully near La Ceiba Agricultural Experiment Station a plant whose stems were thickly covered with young locusts in the hopper stage. The insects would not scatter even when he shook the plant, and he found that the reason was that they were trapped.

The weed has three-sided stalks whose edges bristle with hooklike hairs. In the daytime the plant catches locusts and other insects which wander into its way, and at night armies of carnivorous ants arrive to eat the prisoners up, climbing up the smooth sides of the stems. In the morning the plant is clean once more, ready to work again, and so it is an automatic trap. Sr. Gandara believes the weed might well be planted in fences about fields in areas subject to locust plagues.

*Science News Letter, August 26, 1933*

PSYCHOLOGY

# An Ape For a Baby Sister

## In an Astonishing Experiment an Infant Chimpanzee Grows up With a Little Boy as a Member of the Family

By MARJORIE VAN de WATER

See Front Cover

STORIES of ape children or wild babies—human infants who have been nurtured by wild beasts—have persisted in their appeal to popular imagination since long before the time that Kipling wrote of the wolf-boy Mowgli in his "Jungle Book." Or even before the ancient Romans repeated the myth of Romulus and Remus, sons of Mars, who in their infancy were rescued from a watery grave by a she-wolf and suckled by her along with her own cubs.

You may yourself have wondered what would a child be like who had never heard the sound of human language, never seen any creature walk upright, never learned the complex social customs that even primitive humans have developed.

Scientists, too, have a great interest in this question because of the light it might throw on the vexing problem of the relative importance of heredity and early training in the development of the human mind. Psychologists are anxious to determine by some scientific test whether you are born bright or dull. Whether neither parents nor teachers are able by taking thought to add one cubit to your mental stature. Or whether, on the other hand, the early impressions of your home and school can make or mar you, whatever you are.

Scientists cannot, however, deliberately take a child from his mother and place him with wild beasts for his upbringing. And no case of the nurturing of human young by wild creatures is as yet sufficiently well authenticated and investigated to serve as evidence for the psychologists.

But a psychologist has now evolved a novel attack on the problem.

If it is not possible or desirable to bring up the young human removed from human surroundings—why not test the effects of civilization in the reverse manner? Why not bring up an ape infant in a human home—place him in a human baby's bed, dress him in infant's clothes, bathe him, feed him, fondle him and teach him just as you would a human child?

If the human being's humanity is the result of his training and his human association and environment, not his heredity, would not the young ape respond to these things by becoming "humanized?"

Dr. W. N. Kellogg, of Indiana University, was the scientist who raised these questions. But he did better than just to theorize about it—he actually performed the experiment. He adopted into his own home a little baby chimpanzee, and brought it up in the company of his own small son who was very nearly the same age. The results are reported by Dr. Kellogg and his wife, Mrs. L. A. Kellogg, in a remarkable new book, "The Ape and the Child," just published by McGraw-Hill.

The children, ape and human, played together, ate together of the same foods, slept at the same hours, and together learned to wear shoes, to eat with a spoon, and to play with rubber dolls and toy wagons.

And the little ape learned to walk upright hand in hand with her adopted "brother" and matched, or in many cases exceeded, his development in quite a surprising way.

Little Gua, as the ape child was called, was taken into her human home when she was seven and a half months old, just two and a half months younger than the human child, Donald.

### Further Developed Than Baby

At that time she was considerably further developed physically than was Donald. She had 16 of her quota of 20 milk teeth, and already the infantile opening in the skull was closed and the skull hard, something which does not take place in the human until about the eighteenth month.

Gua was also amazingly strong. Her biceps when relaxed felt nearly as hard as the tensed muscle of many men. She could chin herself with one hand and skin the cat with ease. And it took the best efforts of Dr. Kellogg to hold her against the measuring instrument while he noted her height. Yet she weighed but a mere 12 pounds, and was less than two feet tall!

BABY CHIMP WINS

***Donald often turned his spoon over and lost its contents. Adopted Gua learned to handle her spoon with greater skill than the human baby.***

Introducing this husky ape child to human ways was not always an easy matter. Gua often considered the ape ways more satisfactory, and had many very definite means of signifying this. She, in common with other chimpanzees, was subject to violent tantrums. These have generally been interpreted as temper tantrums, but the Kelloggs believe from their close association with Gua, that they are really more fear than anger. Gua was terribly afraid of all new objects and new procedures.

When having such an emotional disturbance, Gua would give vent to a series of shrill shrieks which could be heard at a great distance. These would continue until her windpipe was completely closed with cramp. Her hair would stand on end, and she would seem blind, running about without direction and bumping into bushes and other obstacles.

Like a baby, Gua was soothed by a rocking motion or the swaying motion of being carried. At first the sight of Dr. Kellogg frightened (*Turn Page*)

her, and she could be reconciled to being in his arms only when she had her back turned so that she couldn't see him, but after he had carried her about for a time, she became greatly attached to him.

By the third day, she would pull at his clothing to be taken up.

The first of her garments were then put on her while she was being carried. Diapers and a bib were thus introduced without undue emotion.

### Continuously Dressed

"By the end of the first week she was continuously dressed in diapers and shoes," the scientists report. "And on one or two occasions she had been clothed in a romper suit as well. Within the same period she began to sleep in her crib (although at first without a full equipment of bedding), and she was regularly fed from a spoon and a cup in her high chair.

"By the end of the second week she permitted the cutting of her finger nails and before the fourth was over she was daily submitting to the application of a toothbrush."

New foods were received in unkindly fashion by both Donald and Gua. Gua drank willingly, although clumsily, from a cup from the first, and since she showed no interest in the nursing bottle, and obviously did not at all understand its function, the cup was used entirely for feeding her liquids.

But when solids were first administered, considerable ingenuity was required on the part of both Dr. Kellogg and Mrs. Kellogg to get Gua to accept them. Strong-arm methods never won. Although she possessed a ravenous appetite, Gua once went without eating a morsel for 43 hours because she refused at each presentation a special kind of infant's soup.

"Be it said to the credit of the little animal that she ultimately won her fight for independence in this respect and was never thereafter given exactly the same dish," the investigators commented.

More effective was the plan of letting her have her own way at the first meal and then serving the dish again a meal or two later. With quiet persistence it would be worked into the diet. Another device was to disguise the new food by mixing it with milk or other more familiar foods.

Soon Gua was eating the same diet as was Donald, but in addition she was allowed some raw vegetables such as lettuce or celery for which she had demonstrated her preference by pilfering them from the kitchen.

OUT FOR A WALK

She would also help herself with great delight, unless forbidden, to the leaves of plants and bushes, to flowers, and to the bark of young saplings.

At first she would also catch insects and chew them for their juices, but she later abandoned this practice. She never showed any other inclination for a raw or cooked meat diet.

The matter of the first bath offered but little difficulty, for Gua discovered that soap suds had for her a pleasant taste. She would bite the generous lather from her arms and hands, and even took a chew off the cake of soap with apparent zest. After a little mastication, however, it was rejected and further offers of soap were received with less enthusiasm.

### Under Bed Linen

After about two months, Gua had progressed sufficiently in her humanizing to be introduced to the clean linen of the human bed and a full assortment of sleeping garments and bed clothing. She was delighted. And when the bedding was temporarily removed a few days later, she cried persistently until, for the peace of all concerned, it was promptly replaced.

It was when she had had the soft bed and bed clothing for a few weeks that she displayed what might be interpreted as nest building behavior. Each night when she was put to bed she would proceed to pull out the covers, wad them into balls, throw them over her head, and generally make a complete mess of the bed. Although serious measures were taken to prevent this, she persisted in it until the end of the experimental period. There was no observable pattern, even of the crudest sort, in her rearrangement of the covers.

This bed tumbling was not shared by Donald, and might be considered the manifestation of some ape instinct. On the other hand, it might be a display of the almost universal tendency of infants for bedtime play, Dr. Kellogg points out. If Gua was very drowsy when she went to bed, there was no blanket tossing. And when the bed was straightened after she went to sleep, she did not again upset it.

Another type of "instinctive behavior" of the ape was watched for but was not observed in Gua. She never did any of the skin searching or skin picking so commonly observed in caged apes and monkeys.

Her affectionate behavior was striking. She was much more dependent upon human society than was the boy Donald. She would cry pitifully when her "parents" would leave her, and no punishment was quite so terrible to her as to be shut in a room by herself.

When she was naughty and was punished or even gently rebuked, she would

rush to the person offended and try to kiss for forgiveness. If held off or repulsed she would cry with great emotion until the disciplinarian relented and accepted her kiss. Then she would heave a great sigh of relief.

Although she would forget admonitions much more quickly than would Donald, she was much more ready to obey when first spoken to. Never would she deliberately persevere in misbehavior, although she did develop a sly way of getting into mischief when not observed.

Throughout the experiment both ape and human infant were given scientific tests of their mental development and the results recorded in precise form in a journal, or scientific diary. Twenty-eight special tests and experiments were devised for comparing the progress of the two babies, and well-known psychological tests for babies were administered to ape as well as child.

On many of these tests, the little ape distinguished herself for her superior ability. When the problem was to secure a bit of apple from beyond a fence by pulling it forward with a hoe, little Gua had no difficulty in getting the idea of making use of the tool. Neither had Donald, but to him the hoe was of more interest as a plaything than as a means for securing the apple.

Donald at 17½ months was able to point to the "bow-wow" in a set of pictures used for testing knowledge of words. Gua at 15 months could point out not only the "bow-wow" but also the shoe. Gua, as well as Donald, would respond correctly to such simple directions as: "Show me your nose," "Hand me your bib," and "Not in your mouth."

Physically, Gua matured much more rapidly than did Donald. This the Kelloggs expected.

But this superior rate of physical development was also accompanied by a superior ability to learn what we consider human behavior.

This chimpanzee infant was able to eat with a spoon, drink from a glass, walk upright, skip, and practice desirable toilet habits, all much better than the average child of her age.

Does this mean that the chimpanzee infant is more intelligent than is the human child of the same age? Not at all, Dr. Kellogg warns us. We still do not know what the ape's capacity for mental development is—what is the limit beyond which she cannot grow.

What we do know is that when a mental test is given an ape—or a child—more than just native capacity is tested.

This background of training or lack of it, of human or un-human treatment, of confinement and petting, or of freedom with responsibility and respect—this is all a part of what is tested along with the inborn capacity handed down to the creature by heredity.

And if the environment means so much to the development of an ape—a child must receive tremendous influences from his surroundings and early training. This finding, Dr. Kellogg believes, has important applications for education, child psychology, biology, and sociology.

*Science News Letter, August 26, 1933*

PHYSICS

# Cosmic Rays Supply Most of Energy For Universe

COSMIC RAYS are the chief source of energy in the universe. From 30 to 300 times more energy is shooting through celestial space in the form of cosmic rays than in all other radiant energy forms combined. This is the conclusion of Drs. I. S. Bowen, Robert A. Millikan and H. V. Neher of the California Institute of Technology, expressed in a communication to the *Physical Review*.

Their estimates of the energy falling on some body millions of light years away from the earth is based on new high-altitude measurements of cosmic ray intensities. They conclude that the energy falling on the earth from the stars is only twice as great as that coming from space as cosmic rays.

The earth is located not far from a huge group of stars that astronomers call our galactic system so that the earth is in a region of highly energized space. A body located in inter-galactic space would receive from 60 to 600 times less star-light than the earth.

The California scientists have taken measurements on the decrease in strength of the cosmic rays as these rays plow through the atmosphere. By adding up all the measured energies over all heights from the surface of the earth to the top of the atmosphere they have obtained definite information on the total cosmic ray energy intercepted by the earth.

The estimates of the density of starlight energy in the universe were made by Dr. S. A. Korff, also of the California Institute of Technology. The uncertainty as to the exact amount depends upon the uncertainty as to the exact number and brightness of all the stars and luminous matter in the universe.

*Science News Letter, August 26, 1933*

BOTANY

## Century-Old Collection Yields New Plant Species

PLANT species entirely new to science, though they were collected, pressed and dried over a century ago, are being turned up daily at the U. S. National Herbarium. The collection of botanical specimens which is yielding these new scientific treasures has had a romantic history.

In 1783 a noted Spanish botanist and physician, José Celestino Mutis, was sent by his king, Carlos III, to make a great collection of plants in northern South America. Establishing what he called a "scientific factory" in Bogota, with a staff of assistants and artists, he accomplished a tremendous amount of work, but he was interrupted by death in 1808 with his ambitious project still unfinished.

During the Colombian revolution in 1816 the collection and paintings of flowers were sent to Spain. They have been in Madrid ever since, with nothing much done about them, although a couple of abortive attempts were made to resurrect the collection and complete Mutis' work.

Last year Ellsworth P. Killip, of the Smithsonian Institution, visited the botanic garden at Madrid, and together with Dr. Arturo Caballero, director of the garden, made a cursory examination of the collection. It became apparent that there was much material of high scientific interest in it. Mr. Killip brought home duplicate specimens of many of the plants, and is working on them in Washington at the National Herbarium, while Dr. Caballero is examining the specimens in the main collection in Madrid. Thus far, more than a hundred new species have been discovered among the old pressed plants.

*Science News Letter, August 26, 1933*

TECHNOLOGY

## First Coat of Paint Is Little Protection to Wood

THE FIRST coat of paint by itself is almost useless in protecting wood against weathering. The assumption that the second and third coats were for appearance and durability alone is shown to be incorrect from tests conducted by F. L. Browne on many types of paints at the Forest Products Laboratory, Madison, Wis.

It is claimed that the major portion of the protection offered by paint comes from second and further coats. Mills that supply lumber primed for protection against shipment and handling are wasting their efforts.

There are two general types of primers on the market, aluminum and granular white pigment paints. As a primer alone aluminum paint is less effective than white paints but it seems to serve as a better base for further coats of ordinary paints to make a complete protective cover.

Mr. Browne states that special primers can be developed that will offer good protection against moisture by themselves and will serve as suitable bases for durable coats of ordinary paints. A perfect primer would be one that would contain enough pigment in the proper form to exert a capillary action in opposition to that of the wood so that absorption of oil out of the top coats of paint would be kept at a minimum.

*Science News Letter, August 26, 1933*

ORNITHOLOGY

## White Pelicans Need Study and Care

WHITE pelicans, among the most interesting of the water birds of western America, are in need of careful scientific study and additional protection of their few remaining nesting grounds if the species is to be kept alive. So declares Ben H. Thompson, well-known naturalist, in a study just completed for the U. S. National Park Service.

There are still from 20,000 to 25,000 of these great birds in the United States, plus an unknown but probably smaller number in Canada. But their tenure of life is not so secure as their numbers might indicate, Mr. Thompson says. In the old days, before the West became so well settled, they had plenty of nesting grounds. Mr. Thompson's study of the record indicates something over 70 known locations of colonies scattered over the western parts of Canada and the United States in earlier times, whereas there are now only seven known large nesting colonies. Fortunately, five of these are in government-protected areas.

Several years ago there was a brief period of artificial control of the pelican numbers on Molly Island in Yellowstone Lake, because of the pelican's role as carrier of a parasite of the trout. However, this policy has been given up and the Yellowstone pelicans now enjoy absolute protection by the National Park Service. No one is even allowed to land on Molly Island without written permission from the Park administration.

*Science News Letter, August 26, 1933*

ASTRONOMY

## Companion to Dog Star May Test Relativity Theory

RELATIVITY is on the witness stand again just because the companion star to Sirius, the brightest star in the sky, has been found to be three times as bright as previously thought.

The trouble that arises from this is explained by Dr. A. N. Vyssotsky, University of Virginia astronomer, in a communication to the *Astrophysical Journal*. The size of a star is known from its brightness so the companion star must be much larger than heretofore assumed. Thus bodies on its surface weigh less than before. Scientists are interested in the force of gravity on heavenly bodies for it is this force that produces the Einstein "red shift," which means that light coming from this star has had its frequency of vibration decreased or its color reddened by a minute amount. The heavier the star, the redder the light it gives off.

Values of this red shift obtained by Dr. Walter S. Adams at the Mount Wilson Observatory are greater than can be accounted for from Dr. Vyssotsky's observations.

This little star has caused trouble in the past, for astronomers had to assume that it was made of something about 2400 times heavier than gold. This trouble is partially overcome by Prof. Vyssotsky's observations which indicate that it is about 400 times as heavy as the densest object on earth.

This article corrects the one used in *SNL Aug.* 19, *page* 121.

*Science News Letter, August 26, 1933*

# IN SCIEN

PALEONTOLOGY

## Rare Marine Animal Fossils Discovered in Mexico

THE DISCOVERY of fossilized bones of a sirenian, prehistoric marine mammal, was announced in a publication of the Biological Institute, a branch of the Mexican National University, by Dr. Frederick G. K. Müllerried, member of the Institute.

The sirenian is a very rare species of animal, and its fossil ancestors apparently were as well. Their remains have not often been found in America, and this is their first fossil discovery in Mexico. They were found in the southern state of Chiapas, between Tumbalá and Yajalán, and consisted merely of two ribs, lying parallel, and a fraction of an inch apart. This and other evidence indicated that the bones had lain that way without being carried away from the spot where the animal died many years ago.

It is supposed that the creature was about fifteen feet long. Its ancient habitat was shores of seas and rivers near the coasts.

*Science News Letter, August 26, 1933*

ASTRONOMY

## White Spot is One of Row on Saturn's Middle

THE WHITE spot that now decorates the ringed planet Saturn is in reality the brightest of a row of spots strung over some forty degrees in longitude, or one ninth of the length of its equatorial belt, Prof. Otto Struve, director of the Yerkes Observatory, has informed Harvard College Observatory.

Prof. G. Van Biesbroeck, using the 40-inch Yerkes telescope, observed the passage of the spot over the central meridian, and using earlier data given by U. S. Naval Observatory observers, has found that the period of rotation of Saturn is 10 hours 15 minutes, a value that compares favorably with past determinations.

The discovery of the white spot is described in *SNL, Aug.* 19, *p.* 115.

*Science News Letter, August 26, 1933*

# FIELDS

GEOLOGY

## British and Americans Agree on Names of Minerals

BRITISH-AMERICAN accord, faced with difficult problems in the economic field, is by contrast almost perfect in one branch of science: the correct naming of minerals. At the recent International Geological Congress in Washington, a joint committee representing the two national groups thrashed out the divergences in naming many mineral substances that have long caused difficulties both in purely scientific work and in such applied branches as mining, quarrying and oil production. It is announced now that a standard set of names has been adopted to replace the old divergent ones, and that uniform spellings and use of symbols have also been arrived at.

On a very few items the committee did not reach a definite agreement, and these have been referred to a subcommittee for further discussion.

*Science News Letter, August 26, 1933*

RADIO

## Unbreakable Metal Replaces Glass in Radio Tubes

BETTER radio reception is available through the development in England of metal tubes in which the glass and one element of the old tubes are replaced by a copper cylinder.

It was no doubt a matter of chronological laziness that made engineers construct the outside of radio tubes from glass, for the technique was already developed for electric light bulbs. The first essential for a tube is that it must contain a vacuum and in some ways glass is the handiest material to satisfy this condition. But glass can not be machined to a definite size so that old tubes were not as similar as the peas in a pod. Also the heat developed in the glass tubes could not be quickly dissipated, for glass is a fine heat insulator and this overheating led to a shorter life for the tube. Perhaps worst of all, the tube is fragile. The new metallic tubes were developed by the General Electric Company in conjunction with the Marconiphone Company.

By replacing the glass cover with a metal one which at the same time takes the place of the anode it is claimed that all these difficulties have been overcome. A greater accuracy in the spacing of the elements is possible which will mean more uniform quality in reception for the listener.

The copper cylinder that forms the outside of the tube is closed at the top and is sealed directly to the glass at the bottom. The electrodes that project through the glass to the inside of the copper tube are held rigidly in a steel clamp with mica insulation. This glass sits on a rubber cushion which acts as a sound insulator and keeps the tube from being upset by noise vibrations.

Since this copper anode is exposed to the air it cools rapidly so that the tube is kept at a low temperature.

*Science News Letter, August 26, 1933*

CHEMISTRY

## Improved Analysis Helps Oil-Prospecting

TWO YOUNG scientists, W. A. Sobolov and M. G. Gurevich, have gone to the Baku oil-fields to locate new oil-wells by means of a method of gas analysis that was originally designed to probe the transmutation of elements.

The improved method allows the analysis of exceedingly small quantities of gases such as marsh gas (methane) and other hydrocarbon gases which accompany oil and, being so much lighter and gaseous, penetrate through the rocks to the very surface. During actual prospecting, samples of gas are pumped out at a depth of one meter. The presence of a certain amount of hydrocarbon gases indicates the probability of oil below.

Tests made at Grozny and Baku in 1930 gave good results, comparing very favorably with the drill-method of prospecting. The latter even under favorable conditions average only one oil-pocket discovery for ten borings.

The improved method of gas-analysis was originally devised by Messrs. Sobolov and Gurevich in order to detect the minute amount of gases liberated during atomic disintegration. It is hoped that by means of the new high precision method a full identification of the products of disintegration of certain atoms will be accomplished.

*Science News Letter, August 26, 1933*

ENTOMOLOGY

## Insect Sheds Five Legs To Avoid Capture

LOSING legs seems to mean nothing at all to that strange insect of prey, the praying mantis, devil's horse, or devil's walking-stick, to use only a few of his aliases. Prof. C. G. Guthrie of the University of Pittsburgh tells in *Science* of one that sacrificed five of his legs in an effort to escape capture—three of them after his head had been cut off.

Prof. Guthrie found the insect in a tree, with his forelegs raised and folded over his feelers. He tried to pick him up gently by those same forelegs. The insect shed them as soon as they were touched. Since the poor mantis cannot capture food without his front legs, Prof. Guthrie snipped off his head with a sharp knife so that he might not be doomed to slow death by starvation. Then he attempted to pick up the body by another leg. This also was promptly shed, and the self-amputation was performed on a fourth leg and a fifth.

Only when but one leg remained could the insect be picked up by it—and even then the body struggled as though in an endeavor to free itself.

Prof. Guthrie tried picking up immature mantises by the legs, and found that they could not shed them. Likewise the Old-World praying mantis, which has become naturalized in the Eastern states, is unable to amputate its own legs when threatened with capture.

*Science News Letter, August 26, 1933*

AERONAUTICS

## Germans Strive to Fly By Muscle Power

BRAWN alone as the motive power for airplanes is the hope of the Polytechnic Society of Frankfurt in offering a prize of 5,000 marks to the first man to fly 550 yards in a muscle-powered machine.

Competitors are allowed to store up energy in the machine for a half hour just before the flight. Some ideas that have been suggested are twisting of strong rubber bands or the pumping of compressed air to drive the propeller.

It is hoped that workable inventions will provide valuable help to gliders caught in dangerous air currents.

*Science News Letter, August 26, 1933*

ARCHAEOLOGY

# Ancient Aztec Capital Being Dug Out Beneath Mexico City

## Excavations Rushed During Disagreeable Rainy Season Reveal Striking Ruins of Pre-Cortes Aztec Glory

THE IMPORTANT excavations unexpectedly begun by Mexican government archaeologists at the site of the great Aztec teocalli, or god-house, adjoining Mexico City's national cathedral have already yielded ancient remains. Human bones, remnants of plaster walls and floors, pre-Spanish pottery, were among the first discoveries.

The excavations are directed by Emilio Cuevas. Eduardo Noguera, chief of the department of archaeology at the Mexican National Museum, is making stratigraphic explorations.

The site, judging from old maps, was the heart of the Aztec city of Tenochtitlan. Here stood the greatest Aztec temples. So important are the possibilities which may lie beneath the ground here that the archaeologists are excavating in spite of the handicaps of the rainy season. Their chance to dig here is unexpected and must be seized. Modern building plans have just removed the old tumble-down shops and houses which for four centuries stood in the way of explorations at the site.

Twenty years ago, when another old colonial building was razed on the opposite corner, Dr. Manuel Gamio found such important Aztec ruins that the "ugly hole in the ground," as unsympathetic real estate dealers call it, has been left open. Street car riders passing the corner can see some of the big stone serpent's heads that once formed a sort of fence around the great Aztec public square. A corner of the foundations of the war-god's temple is seen in the hole, and sculptured figures of Aztec priests and warriors have been placed in the tiny local museum. These lined the stairs of the ruined pyramid, long hidden under the cellar floors of colonial homes.

Little is known of Aztec history, except from tangled Indian legends. Sr. Noguera's stratigraphic excavations at the downtown corner may reveal whether or not other civilizations prior to the Aztec occupied the island city.

The wall of a small white "temple" has proved a puzzling find. To locate the bottom of the ancient structure, excavations have been pushed 20 feet below street level. In spite of the depth, no potsherds of any native culture except Aztec have so far been found.

Three floors, which were probably former street levels of the Indian city, have been superposed at different heights. The two upper ones were laid with large stone slabs, but the third, and lowest, is of concrete. Water-level has been reached, for the area was originally part of a swampy island in a lake. As there are few fires in the modern stone-built Mexico City, the municipal firemen, with little to do, pump water out of the excavations while archaeologists work.

The stone "temple" goes down much deeper than was supposed. It is massive in structure, but with its sloping wall and cornices it is not plain. Although the top cornice is like those on certain Maya buildings in Yucatan, so few samples of Aztec architecture survived Spanish destruction that it cannot be said that it is not Aztec. In fact the structure may help to determine just what "Aztec" architecture is.

Some of the archaeologists in Mexico City do not think that the structure is really a temple, but believe it more likely a solid platform, perhaps that on which the ritual of the gladiatorial sacrifice took place. The circular stage for combat faced the great pyramid on which the temple of the war god stood. The victim was tied to a pillar in its center by one leg, and allowed to fight for his life against four untrammelled warriors. If he won in the uneven battle he did not need to be sacrificed.

Discovery of a stone stairway beginning on the left end of the "temple," however, has strengthened the theory that the structure is part of the great temple. If the little "temple" was really the end of a wide stone balustrade of a former stairway, then the stairway and the pyramid it ascended must have been gigantic. How wide the stair actually was cannot be seen, for it goes under the street.

The ruins of the Aztec city dug up from beneath the sub-soil of the present Mexican capital are not the same ones that Cortes saw.

The native city had temples, pyramids and streets which had been many times rebuilt, new constructions being made on top of old ones. As the original Aztec city was on a swampy island in a lake, the Indian buildings sank

CHEMISTRY

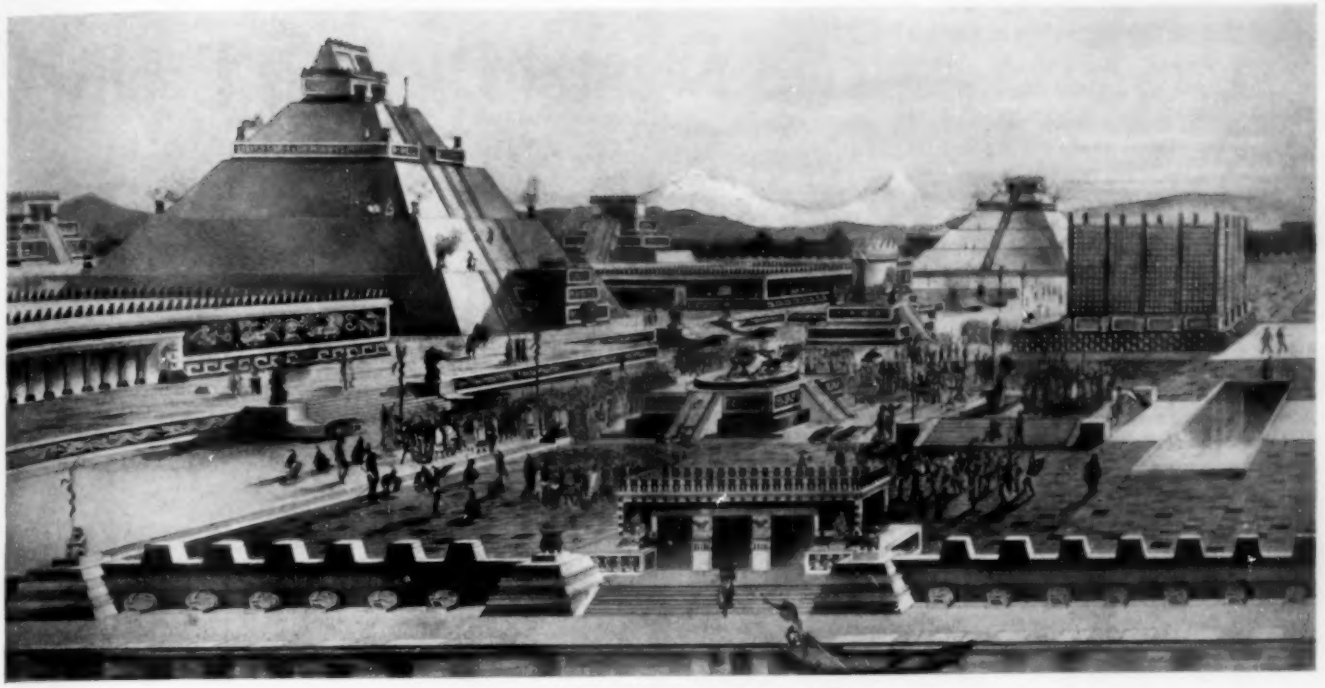
# Valuable Chemical To Be Extracted From Seawater

BROMINE, a chemical valuable in warfare and industry, can now be extracted cheaply from seawater, although only one pound exist in 2,000 gallons of water.

A large commercial extraction plant is being built at Kure Beach, N. C., by the Ethyl-Dow Chemical Co. to take advantage of a commercially practicable scheme recently developed by the Dow Chemical Company. Each unit of the new plant will produce 250,000 pounds of bromides each month by treating 13,000 gallons of seawater every minute of a 24-hour day.

The water passes through the extractor in less than a minute. It is treated with a small amount of a cheaper chemical, chlorine, to free the bromine in the water. Compressed air then blows the free bromine out of the water and sends it over a soda solution to concentrate the bromide.

A world shortage of bromine is now impossible because a cubic mile of seawater contains about 600,000,000 pounds of bromine. This chemical, which is the only liquid non-metallic element, is particularly useful in photography, medicine, and in the manufacture of tear gases and anti-knock gasolines.



**AS IT LOOKED IN AZTEC DAYS**

***A rare chance to dig in this sacred area of the Aztec capital is being seized by Mexican government archaeologists. In this temple enclosure you see at the left the lofty temple to the war god Huitzilopochtli, with the famous Aztec calendar stone vertical against the platform at the pyramid base. It is here, in a patch of ground once a part of the great temple's foundation, or close to it, that the present excavations are being made. Two other lofty temples are shown, and a round temple to Quetzalcoatl, god of the wind. In front of the round temple is a circular stone on which sacrificial combats were staged. At the extreme right is a skull rack—one of the seven in the temple enclosure. A corner of Montezuma's palace a low, rambling structure, is shown in the center, surrounded by the temples. This reconstruction, which shows only a portion of the extensive temple enclosure, was made by Ignacio Marquina, chief of the Direction of Prehispanic Monuments, at Mexico City.***

(as modern Mexican ones still do) so that floor levels had undoubtedly to be raised from time to time.

The Spaniards came along, levelling the city with its buildings, leaving older inner portions of Indian structures exposed to view. The mysterious little white temple discovered in the cathedral lot is believed by archaeologists to be some such anterior structure.

Water-level has been reached in the perforations Mexican archaeologists are making, but man-made remains continue. Pumps are working and excavations will continue until virgin soil is reached in order to reveal the antecedents of the Aztec capital.

The street that now runs west across the back of the present cathedral was the Aztec causeway along which Cortes escaped out of the island-city one "Sad Night" in 1519 before the Conquest. It was also that street down which the great twin temples of Huitzilopochtli and Tezcatlipoca looked from the top of their high pyramid which was erected at right angles to it.

It has been proved lately that Indian temples and pyramids were built to look straight into the setting sun on the Indian New Year's day, which was July 26, the day the sun goes back from its wanderings in the northern hemisphere into the southern. In order to face in that way, the buildings had to be set a little north of true astronomical east and west, the angle varying with the latitude. The east-west streets of modern Mexico City, which follow the former Aztec causeways, are similarly askew.

In order to test out the hypothesis that the Aztec capital was itself oriented in accordance with the Indian New Year's day, and the modern Mexican capital also as a result, measurements are being made on the ruins of an Aztec pyramid unearthed fifteen years ago by Dr. Manuel Gamio, just across the street from the present excavations in the cathedral lot.

Mexican archaeologists are also studying maps of Mexico City from earliest colonial times to modern ones in order to locate the limits of the Aztec city within the modern one that covers it.



GEOLOGY

## Free of Ice, Northern Lands Appear to Be Tilting

NORTHERN lands that bore the vast ice load of the Glacial Age for a million years now appear to be slowly rising, as one end of a raft rises in the water when weight has been removed.

This is the interpretation of apparent changes in land levels in the northern United States, Canada, and the Baltic regions of Europe, by Dr. B. Gutenberg of the California Institute of Technology. Dr. Gutenberg's study, appears in the *Journal of Geology*.

The tiltings examined by the California scientist are very slight, as measured by the year—only about two-fifths of an inch annually between Chicago and the northeastern part of the Great Lakes region. But if they have been going on for the past hundred thousand years or so they would amount to a good deal in the aggregate.

Dr. Gutenberg's suggestion is based

on the theory, widely accepted among geologists, that the continents really are like rafts floating in water. They consist of masses of lighter rock, mostly granite, floating in a heavier rock that is not wholly rigid, but rather yielding under a burden after the fashion of the traditional molasses in January, or oozy asphalt on a hot summer street. The extreme viscosity of such "gummy" rocks would account for the fact that the continent-rafts are still tilting, though the last fragments of the great glaciers melted off the face of northern Europe some eight or ten thousand years ago.

If the northern ends of the continents are rising, a compensating sinking should be expected to the southward. Some evidences that such a thing is occurring have been obtained, but they are rather too equivocal to be satisfying to scientists, and Dr. Gutenberg recommends further close study of the subject of sinking coasts.

*Science News Letter, August 26, 1933*

VOLCANOLOGY

## Volcanic Eruptions Possible in Arizona

VOLCANIC outbursts may occur some day in northern Arizona, in the region of the San Francisco Peaks, a group of lofty and well-known mountains. A study of a number of eruptive centers in this area by Harold S. Colton of the Museum of Northern Arizona strongly suggests that these were formed by successive outbursts, separated by fairly long time intervals. Recent earthquakes in northern Arizona seem to have centered under the San Francisco Peaks, and Mr. Colton interprets this as evidence that the volcanism of this region is not yet dead.

*Science News Letter, August 26, 1933*

PSYCHIATRY

# Two Mental Diseases Really Five, Statistical Study Shows

THE MANIC-depressive and dementia praecox psychoses are not two separate mental diseases, but really five diseases all of them related more or less closely to each other by common underlying causal factors, it is indicated by a study just completed by Dom Thomas Verner Moore, of Catholic University, Washington. His report is published as one of the University's *Studies in Psychology and Psychiatry*.

Father Moore made use of a new statistical technique. Instead of trying to fit each patient into some arbitrary category according to previously developed schemes of diagnosis, he listed a number of well-known symptoms and gave eacn patient a numerical rating by a specially constructed scale to indicate the extent to which he displayed that symptom. Among these symptoms were included some of an emotional nature, such as irritability, abnormal feeling of exultation, giggling, depression, and so on. Another group included abnormalities of thought such as delusions, loss of memory, defect of perception, and the like. A third group included matters of history such as previous attacks, insane relatives, and alcoholism in the family.

Statistical methods showed some of these symptoms to be closely related, in the sense that a general factor or identical group of causes binds them together. Symptoms bound together by a general factor are termed syndromes. The five syndromes, made up of symptoms usually taken as signs of either manic-depressive psychosis or dementia praecox, are: catatonic, deluded and hallucinated, paranoid irritability, cognitive defect and constitutional hereditary depression.

The catatonic syndrome, for example, contains the following symptoms; mutism, or refusal to talk; negativism, or refusal to comply with any simple request; refusal of food; and the adopting and maintaining of fixed or peculiar attitudes such as standing on one leg or staring into space. These symptoms are shown by the mathematical technique to be signs of the same thing.

The five syndromes are proved by their intercorrelations with each other to have also underlying them a common group of causal factors. Father Moore pointed out that Rüdin and others have shown that the heredity of dementia praecox must be due to two Mendelian recessive traits. The present work suggests that only one of these factors need be specific for dementia praecox; the other may be common to dementia praecox and manic-depressive insanity.

The study points out that the manic-depressive and praecox disorders are dominantly an upset of emotional life. Intelligence defect is also involved but is relatively unimportant. It is pointed out that normal mental life must have the normal counterpart of the syndromes by which the insanities are constituted. Corresponding to intelligence defect there is the general factor underlying normal intelligence; corresponding to the general factor underlying anxiety and depression are normal balanced elements of emotional life of a definite nature; corresponding to irritability and tantrums, another normal factor in emotional life, and so on.

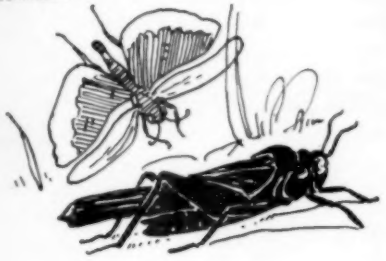
*Science News Letter, August 26, 1933*

A $3,000 crop of spinach was destroyed in one night on Staten Island by a cloud of poisonous smoke coming over from New Jersey.

The Smithsonian Institution has received the smallest jointed doll on record: a wooden doll from Switzerland, slightly over half an inch tall.

## NATURE RAMBLINGS
*by Frank Thone*

ENTOMOLOGY



### Hospitality to 'Hoppers

THAT man's house-pests, like rats and mice, cockroaches and other insect vermin, thrive best where man provides shelter and an abundance of food, is a truism of long standing. None the less striking is the perverseness with which man often provides the most favorable conditions for the enemies of his crops, orchards and forests.

Take grasshoppers, for instance, which this summer have done millions of dollars worth of mischief in the western wheat areas. Unlike many of our crop pests, grasshoppers are natives. They were on the prairies and plains before agriculture came, feeding on the native grasses and other plants.

Then came the white man and his plow, rooting up the hitherto unbroken sod and replacing the native vegetation with new plants that were immigrants like himself; plants which the grasshoppers usually found more toothsome and nourishing than the provender they had been used to. Naturally they fed better, and more of them grew to adult hopperhood, ready to lay their eggs and provide for the next generation.

They found favorable soil for the laying of those abundant crops of eggs in the unplowed strips of land along the roadsides and fences. So long as the eggs got the shelter of a thin layer of soil, preventing their drying out during the winter, they had no need to fear the cold. The only real enemy of grasshopper eggs is through cultivation, which turns them out to the harsh, droughty winter winds.

This combination of a full dinner table and a secure winter nursery, set up by the grasshoppers' own victims, is the picture presented by Dr. J. R. Parker of the U. S. Department of Agriculture. Dr. Parker recognizes the difficulty of getting rid of the grasshopper eggs by plowing them out of their winter quarters. More effective is the standard practice of spreading poisoned baits of sweetened bran mash in the feeding areas of the insects while they are still young. The only drawback to this method, according to Dr. Parker, is the relatively short effective life of the bait, due to its drying out. If this could be overcome, making it good for several days instead of for only a few hours, the control of grasshoppers would be made much easier and cheaper.

*Science News Letter, August 26, 1933*

MEDICINE

## Sleeping Sickness Outbreak Greatest in History

THE PRESENT epidemic of sleeping sickness, *encephalitis lethargica*, raging in and around St. Louis is the worst in the history of the disease, authorities of the U. S. Public Health Service informed Science Service. On August 21 the record showed 129 cases and 12 deaths; and in previous outbreaks elsewhere not more than twenty or thirty cases have been reported in one place. The spread of the malady has been rapid, too: all the cases have been reported since the last day of July.

One thing which is puzzling public health officers is the curious distribution of cases in the present epidemic. Most of the cases and all but one of the deaths so far reported have been in the suburbs, with a total of some 200,000 population, while the city proper, with a population of about 800,000, has been much more lightly visited by the scourge.

The U. S. Public Health Service is cooperating actively with local health authorities. Dr. James P. Leake has been on the ground since the earlier stages of the epidemic, and Dr. Charles Armstrong is now on his way to join him. The Public Health Service has authorized the purchase of a supply of monkeys, which will be inoculated with virus obtained from the bodies of persons who have died of the disease, in an endeavor to obtain better scientific knowledge of its nature and with the hope of eventually working out a method of prevention or cure.

As yet, the germ of sleeping sickness has not been found. It seems to be one of the filterable viruses—something apparently alive but too small to be seen with even the most powerful microscopes and able to pass through the pores of a fine porcelain filter which is able to stop all ordinary germs.

It appears to invade the human system through the nose, passing along the path of the olfactory nerves to the brain and thence down the spinal cord. If the resulting illness does not end in death it often leaves the victim mentally deranged.

The sleeping sickness of the temperate zone, *encephalitis lethargica*, is not to be confused with African sleeping sickness. The latter disease is caused by an animal germ that is quite visible under the microscope—a relatively large organism, in fact—and is transmitted from person to person by the bite of the tsetse fly.

*Science News Letter, August 26, 1933*

METEOROLOGY

# Famine Stalks After Floods On Tragic Plains of China

FLOOD, then famine, seems to be the tragic sequence when heavier rains than usual fall on the steep hills of northern China. Especially is this so in the case of the Yellow River, "China's Sorrow" since time immemorial, now reported by the International Famine Relief Commission to be inundating an area of 900 square miles, and to be threatening a sudden return to its ancient channel to the south of the peninsula of Shantung, instead of its present course to the north.

What such a flood can mean in China can be realized by reference to the records of one or two past rampages of the Yellow River. In 1925 a smaller flood, covering only 800 square miles, caused a crop loss estimated at $20,000,000. The great flood of 1887-1889, which breached an important dike in Honan Province, resulted in the loss of more than 2,000,000 lives from drowning and in the subsequent famine. These figures were gathered by Walter H. Mallory, who at the time he wrote (*Turn Page*)

his masterly treatise "China, Land of Famine," was secretary of the China International Famine Relief Commission.

China's flood problems result from a peculiarly critical combination of geographical and meteorological circumstances, aggravated by a shortsightedness forced upon her people by their terrific poverty. The greater part of China's crowded millions live on the flat alluvial plains of her eastern provinces. These plains are the gift of the rivers that periodically ravage them, for they have been built up in recent geological time by the washing of silt down from the steep mountain lands to the west and north. Once forested, these uplands have been stripped of every tree and bush that might check erosion and modify the torrential run-off of the violent summer rains. This denudation has hastened the silting of the river channels and also helps to throw into their lower courses enormous loads of water that their levees cannot hold back. So high has the silt piled in their diked-in channels that most of the rivers actually have their bottoms higher than the surrounding land; as Mallory puts it, they are on the plain, not in it. Hence when a levee is breached the flood is trebly disastrous.

Once an area in northern China is under water, it may be months before it is drained again and ready for another crop. For not only are the large rivers confined between high earthen banks, but every small stream must be diked as well, and these dikes work "in reverse" after a flood, preventing the water from leaving the fields. Hence a summer flood may stand on the land all winter and long enough into the following spring to prevent the sowing of the next year's crop. One year's flood in China may thus bring two years' famine.

*Science News Letter, August 26, 1933*



# First Glances at New Books

See Also Page 144

**Medicine—Physics**

AN ELEMENTARY HANDBOOK ON RADIUM AND ITS CLINICAL USE—D. F. Clephan and H. M. Hill—*Oxford University Press,* 164 p., $2.50. As the use of radium therapy has become more wide-spread, the need of such a book has become apparent. Miss Clephan has been associated with radium therapy at Middlesex Hospital, London, for many years, and Mrs. Hill, as radium officer at the Royal Free Hospital, London, has had first hand experience in modern methods of treatment.

*Science News Letter, August 26, 1933*

**Ichthyology**

FISHES: THEIR JOURNEYS AND MIGRATIONS—Louis Roule, transl. by Conrad Elphinstone—*Norton,* 270 p., $3.75. Straightforward, easily flowing, popularly readable accounts of the life histories of eel, salmon, shad and a number of other interesting pelagic fishes.

*Science News Letter, August 26, 1933*

**Astronomy**

THE COMPOSITION OF THE STARS—Henry Norris Russell—*Oxford University Press,* 31 p., 70c. The Halley lecture of June 1, 1933 delivered by the eminent astronomer of Princeton University.

*Science News Letter, August 26, 1933*

**Archaeology**

TEPE HISSAR EXCAVATIONS 1931—E. F. Schmidt—*Univ. of Pennsylvania Museum,* 154 p., 99 pl., $1.50. The Museum Journal has devoted its latest issue completely to discoveries by the Persian expedition led by Dr. Schmidt. At Tepe Hissar—"Castle Hill"—the first season of digging revealed three periods of ancient occupation, from about 3000 B.C. After the third settlement was wiped out, presumably by epidemic, the hill lay abandoned for 2,000 years when a Sassanian settlement, marked by the palace of a noble, rose on the border of the old habitation site.

*Science News Letter, August 26, 1933*

**Horticulture**

IN A WEEK-END GARDEN—Maude Stewart Welch—*Sears,* 298 p., $2.50. An easy, gossipy, rambling book about a garden and the people who went in and out, from March to February.

*Science News Letter, August 26, 1933*

**Anthropology—Psychology**

SACRAMENTS OF SIMPLE FOLK—R. R. Marett—*Oxford University Press,* 230 p., $3.75. Anthropological and psychological essays upon the consecration of natural functions, eating, fighting, mating, educating, ruling, judging, covenanting, healing and dying, written by the rector of Exeter College, Oxford.

*Science News Letter, August 26, 1933*

**General Science**

THE NEW STANDARD ENCYCLOPEDIA YEAR BOOK, 1932—Frank H. Vizetelly, editor—*Funk & Wagnalls,* 548 p., $1.50. A concise alphabetical epitome of the events of 1932, designed to supplement the encyclopedia of the same publishers or to serve as a separate yearbook.

*Science News Letter, August 26, 1933*

**Agriculture**

FOUNDATIONS FOR FARM RECOVERY—*Univ. of Wisconsin,* 31 p. The 1932 annual report of the Extension Service of the University of Wisconsin's College of Agriculture.

*Science News Letter, August 26, 1933*

**Horticulture—Sociology**

COMMUNITY PROGRAMS FOR SUBSISTENCE GARDENS—Joanna C. Colcord and Mary Johnston—*Russell Sage Foundation,* 74 p., 25c. Detailed description of the manner in which hard-put people have been helped to help themselves. This bulletin will still be of use, even though the long-awaited upswing gets started, for we've a long way to go.

*Science News Letter, August 26, 1933*

**Radio Engineering—Physics**

WIRELESS RECEIVERS—C. W. Oatley—*Dutton,* 103 p., 85c. A thorough monograph giving a fairly detailed account of the fundamental principles involved in the design of wireless receivers. It is written by a member of the faculty of King's College, in London.

*Science News Letter, August 26, 1933*

**Astronomy—Physics**

THE ASTRONOMICAL ASPECT OF THE THEORY OF RELATIVITY—W. de Sitter—*University of California Press,* 196 p., $2.50. The Hitchcock lectures of 1932 delivered by the eminent Leiden mathematical physicist, with additions down to Jan. 30, 1933. Of interest to specialists.

*Science News Letter, August 26, 1933*

# •First Glances at New Books

See Also Page 144

**Anthropology**

THE LONG ROAD—Fay-Cooper Cole—*Williams and Wilkins*, 100 p., $1. The "long road" is the road from savagery to civilization. How man has advanced along that road from the place where he was only "man-like" to stages where he gained new masteries and pioneered into higher modes of living is a long, dramatic story. Dr. Cole has packed the drama into a small space, thereby enabling the reader to take in the whole panorama in an evening's reading. The volume is one of "A Century of Progress" series.

*Science News Letter, August 26, 1933*

**National Parks**

RIDING MOUNTAIN NATIONAL PARK—*Dept. of the Interior (Canada)*, 23 p., Free. A handbook of one of the greatest of the Canadian national parks.

*Science News Letter, August 26, 1933*

**Medicine**

DIET IN SINUS INFECTIONS AND COLDS—Egon V. Ulmann, recipes and menus by Elsa Mez—*Macmillan*, 166 p., $2. Diets are so popular that it is no wonder one is being put forward for the cure of sinus infections and colds. Diet as the sole method of treating these ailments, however, has not been accepted by the medical profession generally. It would be wise to submit the book to one's physician before starting to follow its directions.

*Science News Letter, August 26, 1933*

**Vocational Science—Statistics**

OCCUPATIONAL TRENDS IN MINNESOTA—Alvin H. Hansen and Tillman M. Sogge—*Univ. of Minnesota Press*, 115 p., 50c. Minnesota cities contain over 400 per cent. more truck drivers and stockbrokers than in the year 1910. But there is a decrease of 50 to 79 per cent. in blacksmiths, millers, and stenographers. In this period of readjustment, this analysis of the whither of occupational opportunities is most valuable. It is a publication of the Employment Stabilization Research Institute.

*Science News Letter, August 26, 1933*

**Psychology—Vocational Guidance**

DO COLLEGE STUDENTS CHOOSE VOCATIONS WISELY?—Edward J. Sparling—*Teachers College, Columbia Univ.*, 110 p., $1.50. The answer to the title's question is that they do not. Most students want to enter a vocation requiring much more intelligence than they possess, and 70 per cent. want to enter the three most overcrowded vocations in the United States. The sincerity of their vocational choices may be questioned, however, since they display a dearth of information regarding the preferred professions and only two per cent. had read to any extent the literature of the profession.

*Science News Letter, August 26, 1933*

**Paleontology**

THE WORLD OF FOSSILS—Carroll Lane Fenton—*Appleton-Century*, 183 p., $2. Dr. Fenton has the fortunate combination of a smooth and absorbingly interesting popular style in writing and the ability to make drawings of professional excellence and accuracy. This has enabled him to present his well-grounded knowledge of paleontology so entertainingly that if you start reading his book you will not sleep until you have finished it. A useful appendix tells where you can read more about the extinct animals to which his book has introduced you, and where you can see mounted skeletons and restorations of them. This is one of the Appleton New World of Science Series edited by Watson Davis.

*Science News Letter, August 26, 1933*

**Medicine**

THE RESIDUAL EFFECTS OF WARFARE GASES: I. CHLORINE; II. MUSTARD—H. L. Gilchrist and P. B. Matz—*Govt. Printing Off.*, 93 p., 10c. General discussion of residual effects of two gases used in chemical warfare, with case histories of a number of soldiers examined eight or ten years after they had been gassed. This study will be of interest to industrial as well as to military physicians.

*Science News Letter, August 26, 1933*

**Radio**

HINTS AND KINKS FOR THE RADIO AMATEUR — *American Rad.o Relay League*, 80 p., 50c. The radio amateur is one of the most inspiring phenomena of current American life. The spirit of the pioneer still lives in those who experiment in telegraphing and talking upon the short waves. The organization of radio amateurs has got together in this booklet a selection of practical money-saving ideas that have arisen from the experience of 189 radio amateur experimenters.

*Science News Letter, August 26, 1933*

**Mathematics**

SCRIPTA MATHEMATICA, a new journal devoted to history and cultural values of mathematics, has informed the SCIENCE NEWS LETTER that it has a stock of reprints of three recent articles which can be obtained without cost by interested persons able to make use of them. The titles are: *Thomas Jefferson and Mathematics*, by David Eugene Smith; *The Meaning of Mathematics*, by Jackson Keyser; and *Two Magical Manuscripts*, by Joseph J. Schwartz. Requests for copies of these reprints should be addressed to Dr. Jekuthiel Ginsburg, Editor *Scripta Mathematica*, 74 West 176th Street, New York City.

*Science News Letter, August 26, 1933*

**Geography**

RECREATIONAL AREAS OF THE UNITED STATES—*U. S. Natl. Park Service*. A map on which are shown all national parks and monuments, national forests and Indian reservations, national military parks, and state parks, forests, monuments and camp grounds, together with all the principal national highways, in the United States proper, Alaska and Hawaii. In issuing this map, the National Park Service has done a fine thing for everybody who vacations with a car.

*Science News Letter, August 26, 1933*

**Exploration**

JUNGLE MEMORIES—Henry Hurd Rusby—*McGraw-Hill*, 388 p., $3.50. A medical man's reminiscences, after a long and active career, of what he did and experienced in the Amazon basin half a century ago.

*Science News Letter, August 26, 1933*

**Economics**

A YEARBOOK OF RAILROAD INFORMATION, 1933—*Committee on Public Relations of the Eastern Railroads*, 96 p.

*Science News Letter, August 26, 1933*

**Archeology**

KARANIS—Edited by Arthur E. R. Boak—*Univ. of Michigan Press*, 93 p., 29 pl., 14 plans, $2.50. This site has been especially rich in relics of everyday life in Egypt in the centuries around the turn of the Christian era. In this volume are described temples, coin hoards, and botanical and zoological remains found during the seasons of 1924 to 1931 by the University of Michigan expedition.

*Science News Letter, August 26, 1933*

# •First Glances at New Books

Additional Reviews On Pages 142 and 143

**Astronomy—Biography**

THE HERSCHEL CHRONICLE, The Life-Story of William Herschel and his sister Caroline Herschel—Edited by his granddaughter, Constance A. Lubbock—*Macmillan*, 388 p. $6. Because of its many quotations from letters, papers, notes and journals, this biography is to a large extent a source book. It places Sir William and his sister Caroline in the setting of their family circle and of contemporary history. To those interested in the history of astronomy, or to those who wish a detailed account of of the great Herschel, this is an imperative addition to the library shelf.

*Science News Letter, August 26, 1933*

**Geography**

COMPTES RENDUS DU CONGRÈS INTERNATIONALE DE GEOGRAPHIE, PARIS, 1931, Tome II—Union Géographique Internationale—*Librairie Armand Colin, Paris*, 728 p. Proceedings of section two on physical geography.

*Science News Letter, August 26, 1933*

**History**

THE HISTORY OF THE BALKAN PENINSULA — Ferdinand Schevill — *Harcourt, Brace*, 614 p., $5. A revised edition of a comprehensive work covering Balkan history from the earliest time to the present day.

*Science News Letter, August 26, 1933*

**Geology—Commerce**

THE NATIONALITY OF COMMERCIAL CONTROL OF WORLD MINERALS—William P. Rawles—*American Institute of Mining and Metallurgical Engineers*, 44 p., 75c. This is the first of a series planned by the A.I.M.M.E.'s Mineral Inquiry to make factual studies of the world's mineral resources in their political and international relations. The overlapping of political and commercial control is set forth in this pamphlet for the following minerals: aluminum, chromite, copper, iron and steel, lead, manganese ore, mercury, molybdenum, nickel, nitrates, petroleum, potash, silver, sulphur, tin, tungsten, vanadium and zinc.

*Science News Letter, August 26, 1933*

**Education—General Science**

THE SOUND MOTION PICTURE IN SCIENCE TEACHING — Phillip Justin Rulon—*Harvard University Press*, 236 p., $2.50. A scholarly, yet practical inquiry into comparative usefulness of teaching science in high schools in a conventional manner and with the aid of specially produced educational talkies. The study was conducted jointly by the Graduate School of Education and the University Film Foundation at Harvard University, and the schools used in the experiments were located in Massachusetts. In terms of immediate student achievement, teaching technique employing the motion picture film was 20.5 per cent. more effective from the instructional standpoint than was the usual unaided presentation.

*Science News Letter, August 26, 1933*

**Psychology**

MUSICAL CAPACITY MEASURES OF CHILDREN REPEATED AFTER MUSICAL TRAINING—Hazel M. Stanton and Wilhelmine Koerth — *University of Iowa*, 48 p., 35c. One of the series on Aims and Progress of Research.

*Science News Letter, August 26, 1933*

**Marine Biology**

SCIENTIFIC RESULTS OF CRUISES OF THE YACHTS "EAGLE" AND "ARA," 1921-1928, WILLIAM K. VANDERBILT, COMMANDING. COELENTERATA, ECHINODERMATA AND MOLLUSCA—Lee Boone—*Privately printed*, 217 p. Bulletin of the Vanderbilt Marine Museum, Volume IV.

*Science News Letter, August 26, 1933*

**Mathematics**

FIRST YEAR ALGEBRA—Howard B. Kingsbury and R. R. Wallace—*Bruce*, 440 p., $1.32. A text for high schools which can be used both in classes which meet college entrance requirements and those that give the pupils only a minimum of algebra. The appended summary of the historical development of algebra will give the student a background which is too often lacking. The authors are high school teachers of Milwaukee and Chicago.

*Science News Letter, August 26, 1933*

**Sociology**

THE RURAL COMMUNITY AND SOCIAL CASE WORK—Josephine C. Brown—*Family Welfare Association of America*, 165 p., $1. Containing not only concrete hints for the immediate use of the social worker, but also suggestions for a long-time program of social work in the country.

*Science News Letter, August 26, 1933*

**Psychology**

THE FIRST TWO YEARS: PERSONALITY MANIFESTATIONS—Mary M. Shirley—*Univ. of Minnesota Press*, 228 p. $2.50. The third and perhaps most interesting of this series of intimate studies of twenty-five babies. Do infants have distinctive personalities? Indeed they do, says the author, and this personality persists throughout the years of development.

*Science News Letter, August 26, 1933*

**Linguistics**

THE PHONETIC VALUE OF CERTAIN CHARACTERS IN MAYA WRITING—Benjamin Lee Whorf—*Peabody Museum, Harvard*, 48 p., 75c. The view that the picture writing of the Mayan Indians was basically phonetic is revived in this monograph. Mr. Whorf has carried his study far enough to permit him to offer a specimen translation of a simple Maya text. Thus, the phonetic approach to the understanding of Maya writing, almost entirely abandoned for the past forty years, offers new hope for the deciphering of inscriptions and codices.

*Science News Letter, August 26, 1933*

**Botany**

WILD FLOWERS OF NORTH DAKOTA—O. A. Stevens—*N. D. Agric. Coll.*, 51 p. There is much beauty in North Dakota springs and summers, for bloodroot and trillium troop through the timber-strips to meet the pasque flower and bluebell and goldenrod of the prairies and hills. Prof. Stevens tells their story briefly but adequately in this attractively illustrated bulletin.

*Science News Letter, August 26, 1933*

**Economics**

WORLD PROSPERITY AS SOUGHT THROUGH THE ECONOMIC WORK OF THE LEAGUE OF NATIONS—Wallace McClure—*Macmillan*, 613 p., $4. Well documented and informative, this is a history and exposition of the widespread economic work of the League which touches nearly every facet of the commercial, sociological, governmental and intellectual work of the world. The author is now assistant chief of the treaty division of the Department of State.

*Science News Letter, August 26, 1933*